

ABSTRACT

A decoder for decoding low-density parity-check codes is provided comprising a first calculator to calculate $llrR_{ml}$, for each parity check equation, at iteration $i-1$, a decision aided equalizer to equalize $llrR_{ml}$, at iteration i , in response to the first calculator; and a second calculator to calculate $llrQ_{lm}$, for each parity check equation, at iteration i in response to the decision aided equalizer. $llrQ_{lm}$ represents information from bit node l to equation node m , one for each connection, and $llrR_{ml}$ represents information from equation node m to bit node l , one for each connection. The first calculator is responsive to the second calculator. The decoder further comprises a memory to store for each parity check equation, the smallest $llrQ_{lm}$ calculated by the second calculator, at iteration i ; the second smallest $llrQ_{lm}$ calculated by the second calculator, at iteration i ; and an overall sign of $llrQ_{lm}$, calculated by the second calculator, at iteration i . The first calculator is responsive to the memory, and the second calculator is responsive to the first calculator.